

Type F62700 **Furnace**

OPERATION MANUAL AND PARTS LIST

Series 1075

Model No.	Voltage	Control	Display (°C or °F)
F62730	220-240V	Single Set Point	°C
F62730-80	220-240V	Programmable	°C
F62730-26	220-240V	Single Set Point	°C
F62730-26-80	220-240V	Programmable	°C
F62730-33	220-240V	Single Set Point	°C
F62730-33-80	220-240V	Programmable	°C
F62734	100V	Single Set Point	°C
F62735	120V	Single Set Point	°C
F62735-80	120V	Programmable	°C

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F IMPORTANT INFORMATION

This manual contains important operating and safety information. The user must carefully read and understand the contents of this manual prior to the use of this equipment.

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Safety Information

Safety Information

Your Thermolyne furnace has been designed with function, reliability, and safety in mind. It is the user's responsibility to install it in conformance with local electrical codes. For safe operation, please pay attention to the alert boxes throughout the manual.

Alert Boxes



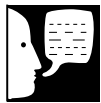
WARNING

Warning alerts apply when there is a possibility of personal injury.



CAUTION

Caution alerts apply when there is a possibility of damage to the equipment.



NOTE

Notes alert the manual user to pertinent facts and conditions.



HOT SURFACE

Hot surfaces alert you to a possibility of personal injury if you come in contact with a surface during use or for a period of time after use..

Warnings

WARNING

To avoid electrical shock, this furnace must:

1. Use a properly grounded electrical outlet of correct voltage and current handling capacity.
2. Disconnect from the power supply prior to maintenance and servicing.
3. Have the door switch operating properly.

To avoid burns, this furnace must:

1. Not be touched on the exterior or interior surfaces during use or for a period of time after use.

To avoid personal injury:

1. Do not use in the presence of flammable or combustible materials ; fire or explosion may result. This device contains components which may ignite such material.
2. Refer servicing to qualified personnel.
3. This warning is presented for compliance with California Proposition 65 and other regulatory agencies and only applies to the insulation in this product. This product contains refractory ceramic, refractory ceramic fiber or fiberglass insulation, which can produce respirable dust or fibers during disassembly. Dust or fibers can cause irritation and can aggravate pre-existing respiratory diseases. Refractory ceramic and refractory ceramic fibers (after reaching 1000°C) contain crystalline silica, which can cause lung damage (silicosis). The International Agency for Research on Cancer (IARC) has classified refractory ceramic fiber and fiberglass as possibly carcinogenic (Group 2B), and crystalline silica as carcinogenic to humans (Group 1).

The insulating materials can be located in the door, the hearth collar, in the chamber of the product or under the hot plate top. Tests performed by the manufacturer indicate that there is no risk of exposure to dust or respirable fibers resulting from operation of this product under normal conditions. However, there may be a risk of exposure to respirable dust or fibers when repairing or maintaining the insulating materials, or when otherwise disturbing them in a manner which causes release of dust or fibers. By using proper handling procedures and protective equipment you can work safely with these insulating materials and minimize any exposure. Refer to the appropriate Material Safety Data Sheets (MSDS) for information regarding proper handling and recommended protective equipment. For additional MSDS copies, or additional information concerning the handling of refractory ceramic products, please contact the Customer Service Department at Barnstead|Thermolyne Corporation at 1-800-553-0039.

Introduction

Introduction

Intended Use

The Type F62700 furnace is a general laboratory and heat treating furnace. For optimum element life, it is suggested that this furnace be used for applications requiring temperatures from 400°F (204°C) to 1600°F (871°C) for continuous use, or temperatures from 1600°F (871°C) to 1832°F (1000°C) for intermittent use. Continuous use is operating the furnace for more than 3 hours and intermittent use is operating the furnace for less than 3 hours.

The unit consists of: 1) muffle heating chamber, 2) a microprocessor control and 3) a door interlock relay for user safety.

General Usage

Do not use this product for anything other than its intended usage.

Principles of Operation

The furnace chamber incorporates a heating element that is embedded into the side walls and top and back of heating chamber. The ceramic fiber oval muffle with four heating surfaces creates even heat distribution within the chamber. The temperature is controlled by a microprocessor control with a type K Chromel/Alumel Thermocouple. A fan is provided in the furnace to provide forced air cooling for the temperature controller. A door safety switch removes power to the heating elements whenever the furnace door is opened.

Single Set Point Temperature Controller

One of the furnace's controllers is a single set point control, with programmable over temperature protection which enables the user to bring the furnace up to a pre-set point and hold the temperature.

4 Ramp & 4 Dwell Programmable Controller

This controller consists of a microprocessor based three-mode (Proportional, Integral, Derivative), programmable temperature controller with "Fuzzy" logic capability, programmable over-temperature protection and appropriate output switching devices to control the furnace. The digital readout continuously displays chamber (upper display) and setpoint (lower display) temperatures unless the "SEL" button is depressed.

The programmable control can be used as a single setpoint control or as a programmable control.

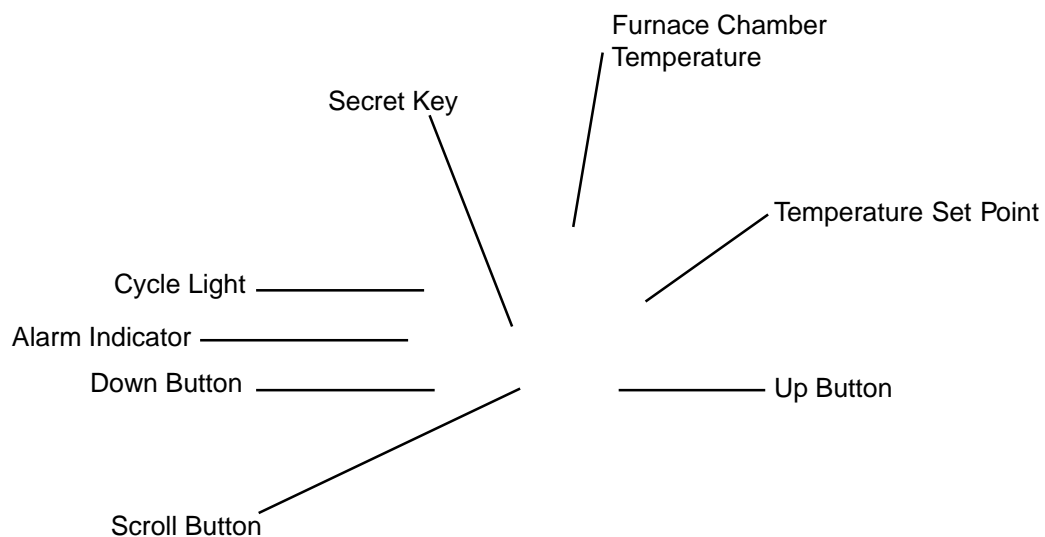


Figure 1
Single Set Point Temperature Controller

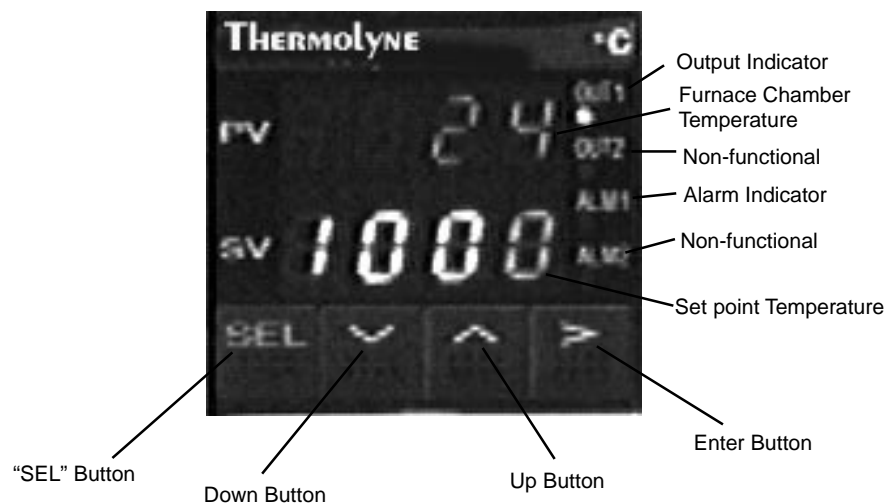


Figure 2
4 Ramp & 4 Dwell Programmable Controller

General Specifications

MODEL NUMBER		F62730, F62730-80	F62730-26, F62730-26-80, F62730-33 F62730-33-80	F62734	F62735, F62735-80
OVERALL DIMENSIONS IN. (CM)	WIDTH	23-1/2 (59.7 CM)	23-1/2 (59.7 CM)	23-1/2 (59.7 CM)	23-1/2 (59.7 CM)
	HEIGHT	16-1/4 (41.3 CM)	16-1/4 (41.3 CM)	16-1/4 (41.3 CM)	16-1/4 (41.3 CM)
	DEPTH	18-3/4 (47.6 CM)	18-3/4 (47.6 CM)	18-3/4 (47.6 CM)	18-3/4 (47.6 CM)
CHAMBER DIMENSIONS IN. (CM.)	WIDTH	11-1/2 (29.2 CM)	11-1/2 (29.2 CM)	11-1/2 (29.2 CM)	11-1/2 (29.2 CM)
	HEIGHT	7-1/2 (19.1 CM)	7-1/2 (19.1 CM)	7-1/2 (19.1 CM)	7-1/2 (19.1 CM)
	DEPTH	11-1/2 (29.2 CM)	11-1/2 (29.2 CM)	11-1/2 (29.2 CM)	11-1/2 (29.2 CM)
WEIGHT	LBS. (KG)	55 LBS (25 KG)	55 LBS (25 KG)	55 LBS (25 KG)	55 LBS (25 KG)
ELECTRICAL	VOLTS	220-240	220-240	100	120
	AMPS	6.2	6.2	14.8	12.4
	WATTS	1488	1488	1488	1488
RATINGS	FREQ. PHASE	50/60 1	50/60 1	50/60 1	50/60 1
OPERATING TEMP.	CONTINUOUS	1832°F (1000°C)	1832°F (1000°C)	1832°F (1000°C)	1832°F (1000°C)

Environmental Conditions

Operating: 17°C - 27°C; 20% to 80% relative humidity, non-condensing. Installation Category II (over-voltage) in accordance with IEC 664. Pollution Degree 2 in accordance with IEC 664.

Altitude limit: 2,000 meters.

Storage: -25°C to 65°C; 20% to 80% relative humidity.

Declaration of Conformity

Declaration of Conformity (for -33 models only)

Barnstead|Thermolyne hereby declares under its sole responsibility that this product conforms with the technical requirements of the following standards:

EMC: EN 50081-1 Generic Emission Standard; EN 50082-1 Generic Immunity Standard;

Safety: IEC 1010-1-92 Safety requirements for electrical equipment for measurement, control, and laboratory use; Part I: General Requirements

IEC1010-2-010 Part II: Particular requirements for laboratory equipment for the heating of materials

per the provisions of the Electromagnetic Compatibility Directive 89/336/EEC, as amended by 92/31/EEC and 93/68/EEC, and per the provisions of the Low Voltage Directive 73/23/EEC, as amended by 93/68/EEC.

The authorized representative located within the European Community is:

European Manager
Barnstead|Thermolyne
Saarbrückener Str. 248
D-38116 Braunschweig
Germany

Copies of the Declaration of Conformity are available upon request.

Unpackaging

Unpackaging

Visually check for any physical damage to the shipping container. Inspect the equipment surfaces that are adjacent to any damaged area. Open the furnace door and remove packing material from inside the furnace chamber. Vacuum the chamber prior to use to remove the insulation dust due to shipping.

The furnace is supplied with two hearth plates. Place the hearth plates on the bottom of the chamber.

Install ceramic sleeve into top vent hole on furnace case.

Retain the original packaging material if re-shipment is foreseen or required.

Installation



CAUTION

Be sure ambient temperature does not exceed 104°F (40°C). Ambients above this level may result in damage to the controller.

Allow at least six inches of space between the furnace and any combustible surface. This permits the heat from the furnace case to escape so as not to create a possible fire hazard.



WARNING

Do not use in the presence of flammable or combustible chemicals. Fire or explosion may result; this device contains components which may ignite such materials.



WARNING

To avoid burns, this furnace must not be touched on the exterior or interior furnace surfaces during use or for a period of time after use.

Installation

Site Selection:

Install furnace on a sturdy surface and allow adequate space for ventilation.

The electrical specifications are located on the specification plate on the back of the furnace. Consult Barnstead/Thermolyne if your electrical service is different than those listed on the specification plate. Prior to connecting your Type F62700 furnace to your electrical supply, be sure the front power switch is in the "OFF" position.

Observe These Warnings Before Operating Your Furnace:

General Operation of Furnace

General Operation of Furnace

WARNING

To avoid electrical shock, this furnace must:

1. Use a properly grounded electrical outlet of correct voltage and current handling capacity.
2. Disconnect from the power supply prior to maintenance and servicing.
3. Have the door switch operating properly.

To avoid personal injury:

1. Do not use in the presence of flammable or combustible materials ; fire or explosion may result. This device contains components which may ignite such material.
2. Refer servicing to qualified personnel.
3. This warning is presented for compliance with California Proposition 65 and other regulatory agencies and only applies to the insulation in this product. This product contains refractory ceramic, refractory ceramic fiber or fiberglass insulation, which can produce respirable dust or fibers during disassembly. Dust or fibers can cause irritation and can aggravate pre-existing respiratory diseases. Refractory ceramic and refractory ceramic fibers (after reaching 1000°C) contain crystalline silica, which can cause lung damage (silicosis). The International Agency for Research on Cancer (IARC) has classified refractory ceramic fiber and fiberglass as possibly carcinogenic (Group 2B), and crystalline silica as carcinogenic to humans (Group 1).

The insulating materials can be located in the door, the hearth collar, in the chamber of the product or under the hot plate top. Tests performed by the manufacturer indicate that there is no risk of exposure to dust or respirable fibers resulting from operation of this product under normal conditions. However, there may be a risk of exposure to respirable dust or fibers when repairing or maintaining the insulating materials, or when otherwise disturbing them in a manner which causes release of dust or fibers. By using proper handling procedures and protective equipment you can work safely with these insulating materials and minimize any exposure. Refer to the appropriate Material Safety Data Sheets (MSDS) for information regarding proper handling and recommended protective equipment. For additional MSDS copies, or additional information concerning the handling of refractory ceramic products, please contact the Customer Service Department at Barnstead|Thermolyne Corporation at 1-800-553-0039.



CAUTION

If the power supply must be disconnected from the furnace at any time, be sure the chamber temperature is 500°C or less before doing so.



WARNING

To avoid electrical shock, this furnace must have the door switch operating properly.

Power Switch:

Switch power switch to the "ON" position. The switch will illuminate when power is on.

FAN:

The fan located in the rear of the control section will run continuously as long as power is supplied to the furnace, even when the furnace power switch is OFF. This serves to remove residual heat after the furnace is turned OFF so the heat does not cause damage to sensitive electronic components.

Cycle Indicator:

The amber cycle light will illuminate whenever the power is being applied to the elements.

Door Safety Switch:

The door safety switch removes power from the heating elements when the door is opened. Open and close door a few times, note that the amber cycle light will go out while the door is open. If this condition is not true, consult the troubleshooting section before proceeding.

Digital Readout:

The Digital Readout continuously displays chamber (upper display) and set point (lower display) temperatures.

Operation of Single Set Point Temperature Control (Automatic) Models



NOTE

The temperature control in these models is a single set-point device. By using the “up” or “down” push buttons a specific temperature can be chosen. The control will cause the furnace chamber to heat to the chosen temperature and hold it at this temperature until you turn off the power switch or select another temperature.



NOTE

When performing the following steps remember that if more than eight to ten seconds elapse before the buttons are used again, the display screen will automatically switch back to displaying chamber temperature. If this happens, light up the front panel again and step through each parameter until you reach the point at which the interruption occurred. The parameter values you checked earlier, however, will not be lost or altered. Holding down on the scroll button allows longer viewing time.



CAUTION

Do not exceed limitations for continuous or intermittent operating temperature shown in the General Specifications. Exceeding these limits will result in severely reduced heating element life.

Operation of Single Set Point Temperature Control (Automatic) Models


Models F62730, F62730-26, F62730-33, F62734, F62735)

This furnace controller consists of a microprocessor based three-mode (Proportional, Integral, Derivative), single setpoint temperature controller. The controller features programmable over temperature protection and thermocouple break protection.

Initial Startup:

When the power switch is turned on the controller will perform a self-test to make sure controller is operating properly. (If all four 1's do not light up or fails to go to “8888” contact Thermolyne.)


Adjustment of Parameters: (See Figure 1, page 4)

To illuminate down ▼ button, scroll  button, and up ▲ button, touch anywhere on front panel.

Set Point Temperature:


Push up ▲ button or down ▼ button, to modify temperature set point (lower digital display).

Temperature Indication:

Push scroll  button once, “°C” will appear. This indicates temperature measurement. (Contact Thermolyne if control needs to be changed to °F.)

Tuning:

This control incorporates a self tuning feature which determines the optimum control parameters for the best temperature accuracy.

Push scroll  button until “tunE” appears. To start tuning function push ▲ button. To stop tuning function push ▼ button.



NOTE

If the power to the furnace is “turned off” or interrupted while in “tuning,” upon return of power to the furnace, the controller display will indicate “LINE FAIL” because sampled data could be questionable. To restart tuning, refer to “Tuning” procedure.

If the controller cannot maintain temperature set point “tunE FAIL” will appear on display. First, correct problem for not maintaining temperature set point, then restart “tuning” procedure.

When the tuning process is started the lower display will flash “tunE” along with the furnace temperature set point. During tuning the temperature set point cannot be changed. To change temperature set point “tunE” must be turned “OFF”.

High Alarm (Over Temperature Protection OTP):

Push scroll button until “AL.SP” (Alarm Set Point) appears. The lower display should indicate 1010°C.

Depress either the “UP” or “DOWN” push button to select the OTP value you desire. Thermolyne recommends that you set the value either at the maximum operating temperature of the furnace or a value of 20 degrees above your working temperature if you desire to provide protection for your workload.



NOTE

HiAL- HIGH ALARM. (over-temperature protection, OTP)

The controller is fitted with a mechanical relay which is de-energized in the alarm mode. This relay, when de-energized, removes power from the heating elements. If the primary control circuit fails, the OTP will control the furnace temperature at the preset value you have entered. It does not shut off the furnace, but will maintain the chamber temperature at that value.

Operation of 4 Ramp & 4 Dwell Programmable Models



WARNING

To avoid electrical shock, this furnace must have the door switch operating properly.



NOTE

For optimum control of a single set point operation, set the “CTrL” parameter to “FUZY” to take advantage of the controller’s fuzzy logic capabilities.



NOTE

The furnace will begin to heat to the current set point temperature when you turn the power switch “ON.” To examine the control parameters without heating the furnace, depress and hold the “DOWN” button until the setpoint (lower) display reads “20”.

Operation of 4 Ramp & 4 Dwell Programmable Models

Models F62730-80, F62730-26-80, F62730-33-80, F62735-80)

This controller consists of a microprocessor based three-mode (Proportional, Integral, Derivative), programmable temperature controller with “Fuzzy” logic capability, programmable over-temperature protection and appropriate output switching devices to control the furnace. The digital readout continuously displays chamber (upper display) and setpoint (lower display) temperatures unless the “SEL” button is depressed.

The programmable control can be used as a single set point control or as a programmable control.

Single Set Point Operation

To use as a single set point control simply push “UP” or “DOWN” button to choose a specific temperature.

1. The set point temperature presently set in the control will be read out on the lower display
2. To change this set point, depress the “UP” or “DOWN” button until the desired set point value is displayed, then release the button.
3. At this point, the furnace will begin to heat if the new set point temperature you have chosen is higher than the present chamber temperature.

Programmed Operation

Control Parameters

You can gain access to the control parameters by holding the “SEL” button depressed for about 3 seconds. “LoCt” will be displayed in the upper display.



NOTE

When examining the parameters, if you depress and release either the "SEL," "UP," or "DOWN" buttons and more than 1 minute elapses before the buttons are used again, the display screen will automatically switch to displaying chamber temperature. If this happens, you will have to step through each parameter until you reach the point at which the interruption occurred. The parameter values you checked earlier, however, will not be lost or altered.

Depressing "SEL" once again shows the next parameter and its current value on the display. The parameter value can either be modified with the buttons or left unmodified. Pressing the enter button (>) will allow you to modify the current value using the "Up" and "Down" buttons. Press the enter button again to set the new value as the current value. (See "Programming Controller" for information on programming.)

The control parameters in order are:

LoCt - Parameter lock level. Determines the number of parameters displayed when you press "SEL". It should be set to "0002." If it does not, set to "0002."

Nod - Mode. By pushing "UP" or "DOWN" buttons, this can be set to "Auto" or "NAn" (Manual). Set to "Auto". In Manual mode, you must enter values to control the furnace chamber temperature.

At - Autotuning feature. Will automatically set optimum P.I.D. values for your process. For Tuning, set to "on." For normal operation, set to "oFF."

StAt - Status. Displays current status of program and cannot be changed.

Time - Time. Displays the time remaining in the current program.

ProG - Program options. Can be set to one of three options: "oFF", "rUn" or "hold". "oFF" will stop any running program and reset the program to the beginning. "rUn" will start a program from the beginning or resume a program from "hold" from the point it was held. "hold" will interrupt a running program without resetting the program to the beginning.

Sü-1 - Set point 1. The temperature at which the first ramp is aiming and at which the first dwell will be held.

tN1r - Ramp time 1. The time the controller will take to charge the chamber temperature from its present temperature to the value of Set point 1. This time may be limited by the physical capabilities of the furnace.

tN1S - Dwell time 1. The length of time the controller will hold the furnace at the Set point 1 temperature.

Sü-2 - Set point 2.

tN2r - Ramp time 2.

tN2S - Dwell time 2.

Sü-3 - Set point 3.

tN3R - Ramp time 3.

tN3S - Dwell time 3.

Sü-4 - Set point 4.

tN4r - Ramp time 4.

tN4S - Dwell time 4.

P-on - Power-on start. Push the “Up” or “Down” Buttons to set to “Yes” or “No.” When set to “Yes,” your furnace will immediately begin running the set program when you power on your furnace. For most applications, set to “No.”



NOTE

Overtemperature protection

The controller is fitted with a mechanical relay which is de-energized in the alarm mode. This relay, when de-energized, removes power from the heating elements. If the primary control circuit fails, the OTP will control the furnace temperature at the value you have entered for AL11. It does not shut off the furnace, but will maintain the chamber temperature at that value.

The next three parameters - Proportional band, Integral and Derivative - are the three control parameters of a P.I.D. control system. The values for these parameters are set during the tuning process. You should not change them; doing so may cause your controller to operate incorrectly.

P - Proportional band

i - Integral

d - Derivative

AL1T - Alarm type. This parameter determines how the controller responds to any alarm input. It should display “0031.” If it does not, set it to “0031.”

AL11 - Furnace overtemperature alarm. This parameter determines the absolute upper limit on the furnace chamber temperature. We recommend a setting of “1000°C” since 1000°C is the maximum temperature your furnace can obtain without damage to furnace components. You may wish to set the parameter lower if you need to ensure a crucial process is protected from high temperature.

AL12 - High deviation alarm. This parameter determines



CAUTION

Remember that whenever the power switch is turned "ON," the furnace will begin to heat at the set point temperature that was previously set. This value will remain unchanged for up to a year without power being applied to the control.

how far the furnace chamber temperature can rise above your set point. We recommend a setting of 20; since a P.I.D. control process involves some degree of temperature overshoot, a setting of less than 20 may interfere with the function of your controller.

LooP - Thermocouple break alarm detection time. For proper operation of your furnace, this parameter should be set to "0.00". If it is not, set it to "0.00".

CTrL - Control type. Push the "Up" or "Down" buttons to set to "Pid" or "FUZY". Programmed operation requires P.I.D. control. Single set point operation will achieve better control using Fuzzy logic control.

Programming Controller

This controller allows you a maximum of 4 ramp and 4 dwell segment combinations, thus enabling 4 different set point levels to be achieved. Each ramp is programmed by specifying the ending temperature level and the required time to ramp to that temperature. The controller then automatically calculates the ramp rate required to attain the ending temperature level based on the desired ramp time. Dwell segments then can be attached to each temperature level to hold that temperature for a specified amount of time.

To run a program, first determine your ramp times, ending temperature levels and dwell times. It is helpful to graph your program out for ease of loading the program into the controller.

Make sure "ProG" (program options) is set to "oFF" (to stop the program) when entering program values.

Push "SEL" button until "Sü-1" is displayed. Push the Enter button (>) to select the current value. Push "UP" or "DOWN" button and set Set point 1 in °C. Push the Enter button to enter the set value as the current value.

Push "SEL" button until "TN1r" is displayed. Push the En-

OPERATION OF 4 RAMP & 4 DWELL PROGRAMMABLE MODELS



NOTE

If you desire to skip a ramp or dwell segment, follow this procedure:

for a dwell segment, enter a setting of "0" minutes.

for a ramp segment, enter a setting of "00.00" hour.minutes. This will cause controller to skip to next segment as fast as the furnace can heat or cool down.



NOTE

The temperature control in these models is a programmable "and" automatic single set point device. When the program has ended, the controller will maintain the chamber temperature at a value equal to the last programmed level (Set point 4) until the program is canceled. It will not automatically cool to ambient unless Set point 4 is set at ambient. When a program is canceled, the controller will maintain the chamber temperature at a value equal to the single set point mode set point.

ter button (>) to select the current value. Push "UP" or "DOWN" button and set Ramp time 1 in hours and minutes in the format "X.XX" (hour.minutes). This is the time Ramp 1 will take to reach Set point 1. Push the Enter button to enter the set value as the current value.

Push "SEL" button until "TH1S" is displayed. Push the Enter button (>) to select the current value. Push "UP" or "DOWN" button and set Dwell time 1 in hours and minutes in the format "X.XX" (hour.minutes). Push the Enter button to enter the set value as the current value.

Set "Sü-2" "TN2r" "TN2S" "Sü-3" "TN3r" "TN3S" "Sü-4" "TN4r" and "TN4S" in the same manner as "Sü-1" "TN1r" "TN1S".

Program Execution

Push "SEL" button until "ProG" is displayed. Pushing "UP" or "DOWN" button, select "run." When "run" is selected, the program will start from the actual furnace temperature at that point in time.

Set point

While the program is in "run" or "Hold," the set point shown on the bottom display is the current working set point.

Program End

When the program ends, the controller will hold the furnace at the value of Set point 4 until you stop the program

Program Stop

To stop program, push "SEL" button until "ProG" is displayed. Push "UP" or "DOWN" button until "oFF" is displayed. This will terminate program.

Self Tuning Feature

This programmable control has an automatic tuning feature which installs optimum tuning parameters to give the best temperature accuracy with your load and set point or program. No manual loading of tuning parameters is needed. **Barnstead|Thermolyne highly recommends using this feature to provide the best temperature accuracy the controller can attain.** Use this feature the first time you use your furnace and each time you change your set point



NOTE

For processes which cannot tolerate the overshoot naturally generated during the tuning process, select "Lo" rather than "on" for the "AT" setting. The "Lo" setting will tune your furnace at a temperature below your set point, then apply the result to your set point. This approach prevents the necessary tuning overshoot from exceeding your actual set point.

or program or the type of load you are heating. To use the Tuning feature:

1. Select the temperature at which you intend to operate. If you will be running a program, enter the value of Set point 1 as a single set point.
2. Load your furnace with a characteristic sample of the load you will be heating.
3. Push "SEL" button until "AT" is displayed, then push "UP" or "DOWN" button to turn "AT" "on."

During the operation, "TunE" flashes in the lower display. Do not make any adjustments to the controller parameters during this period. The self tuning is finished when "TunE" no longer flashes in the lower display.

Self tuning will calculate values for:

Proportional band - P

Integral - I

Derivative - d

- Self tuning cannot be initiated while running a program.
- A power failure will cause the AT parameter to revert back to "OFF". (Reset tune parameter to "ON" using the "UP" button).
- In the case of alarm conditions during tuning, those conditions will flash alternately with "TunE."

The next time you use your furnace, push "SEL" button until "AT" is displayed, then push "UP" or "DOWN" button to turn tune "oFF."

Furnace Loading:

1. For best results use only the center 2/3 of the furnace chamber.

Furnace Loading



CAUTION


Do not overload your furnace chamber. If the load is to be heated uniformly it should not occupy more than the center two-thirds of the furnace chamber. Failure to observe this caution could result in damage to furnace components.

2. If you are heating a number of small parts, spread them throughout the center two-thirds of the furnace chamber.
3. Keep objects away from thermocouple.
4. Use insulated tongs and mittens when loading and unloading furnace.
5. Always wear safety glasses.
6. Use the hearth plates supplied to protect bottom of chamber. Part # PH421X1.
7. Do not exceed a load of 25 lbs. in the furnace chamber.

Preventative Maintenance


Preventative Maintenance

WARNING

 This warning is presented for compliance with California Proposition 65 and other regulatory agencies and only applies to the insulation in this product. This product contains refractory ceramic, refractory ceramic fiber or fiberglass insulation, which can produce respirable dust or fibers during disassembly. Dust or fibers can cause irritation and can aggravate pre-existing respiratory diseases. Refractory ceramic and refractory ceramic fibers (after reaching 1000°C) contain crystalline silica, which can cause lung damage (silicosis). The International Agency for Research on Cancer (IARC) has classified refractory ceramic fiber and fiberglass as possibly carcinogenic (Group 2B), and crystalline silica as carcinogenic to humans (Group 1).

The insulating materials can be located in the door, the hearth collar, in the chamber of the product or under the hot plate top. Tests performed by the manufacturer indicate that there is no risk of exposure to dust or respirable fibers resulting from operation of this product under normal conditions. However, there may be a risk of exposure to respirable dust or fibers when repairing or maintaining the insulating materials, or when otherwise disturbing them in a manner which causes release of dust or fibers. By using proper handling procedures and protective equipment you can work safely with these insulating materials and minimize any exposure. Refer to the appropriate Material Safety Data Sheets (MSDS) for information regarding proper handling and recommended protective equipment. For additional MSDS copies, or additional information concerning the handling of refractory ceramic products, please contact the Customer Service Department at Barnstead|Thermolyne Corporation at 1-800-553-0039.

WARNING

 Disconnect from the power supply prior to maintenance and servicing.

Refer servicing to qualified personnel.

This unit is equipped with a venting system on the top of the furnace. This is for the removal of fumes from the chamber of the unit. Contamination is a major cause of element failure, therefore, when possible remove the fume forming material before heating. (e.g., cleaning cutting oil from tool steel.)

Housekeeping is vital to your electric furnace - KEEP IT CLEAN. Run your furnace up to 1600°F empty occasionally to burn off the contamination that may exist on the insulation and elements. Maintain 1600°F for at least 4 hrs. to insure complete ashing of foreign materials.

Element life is reduced somewhat by repeated heating and cooling. If the furnace is to be used again within a few hours, it is best to keep it at the operating temperature or at a reduced level such as 500°F (260°C).

General Cleaning Instructions

Wipe exterior surfaces with lightly dampened cloth containing mild soap solution.

The Troubleshooting section is intended to aid in defining and correcting possible service problems. When using the chart, select the problem category that resembles the malfunction; then proceed to the possible causes category and take necessary corrective action.

Troubleshooting

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
The power light does not illuminate.	The furnace is not connected to power supply.	Check furnace connection to power source.
	ON and OFF power switch defective.	Replace power switch.
Fan does not operate	The furnace is not connected to the power supply.	Check furnace connection to power source.
	Blown fuses.	Replace fuses.
The furnace does not heat.	No power.	Check power source and fuses or breakers.
	Thermocouple is open or thermocouple leads reversed.	Replace thermocouple or check thermocouple connections.
	Controller malfunction.	Verify and correct all parameters and configuration values. If malfunction persists, replace control.
	Element burned out.	Replace muffle (element).
	Solid state relay defective.	Replace solid state relay.
	Door switch malfunction.	Re-align or replace door switch.
Slow heatup.	Low line voltage.	Install line of sufficient size and proper voltage. (Isolate furnace from other electrical loads.)
	Heavy load in chamber.	Lighten load in chamber to allow heat to circulate.
	Wrong heating element.	Install proper element.
	Wired improperly.	Check wiring diagram for correct wiring of your furnace.
PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
	One side of element is burned out on 120V or 100V unit.	Replace muffle (element).

TROUBLESHOOTING

Door switch does not cut	Door switch is not functioning.	Re-align or replace door safety switch.
Repeated element burnout.	Heating harmful materials.	Clean up spills in and on chamber. Ventilate chamber by leaving top vent slightly open when heating known harmful reagents.
	Wrong element.	Install proper element.
	Oxidized thermocouple.	Replace thermocouple.
	Contamination present from previous burnout.	Clean and/or replace insulation material.
Inaccurate temperature readout.	Wired improperly.	Check wiring diagram for correct wiring of your furnace.
	Oxidized or contaminated thermocouple.	Replace thermocouple.
	Poor thermocouple connection.	Tighten connections.
	Solid state relay malfunction.	Replace solid state relay.
	Improper loading procedures.	Use proper loading procedures.
	Poor ventilation of base or cooling fan failed.	Clear area around furnace base or replace cooling fan.
	Control out of calibration.	Contact Barnstead/Thermolyne.
	Thermocouple connections reversed.	Reconnect thermocouple correctly.
	P.I.D. values invalid.	Re-tune control.
	Control malfunction.	Verify and correct all parameter and configuration values. If malfunction persists, replace control.

Maintenance and Servicing


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WARNING

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Refer servicing to qualified personnel.

 Replace fuses with the same type and rating.

Thermocouple Replacement (Type K)

- a. Disconnect from power supply.
- b. Set furnace on its door.
- c. Remove (one piece) top, back and bottom cover.
- d. Remove retaining clip from the thermocouple and pull the thermocouple straight out from the chamber.
- e. Disconnect thermocouple lead ends from back of the controller and remove the thermocouple.
- f. Reinstall thermocouple by reversing steps A through E.



NOTE

Perform only maintenance described in this manual. Contact an authorized dealer or our factory for parts and assistance.



NOTE

Make sure yellow thermocouple lead wire is connected to terminal #9 on back of the controller.

Make sure red thermocouple lead wire is connected to terminal #10 on back of the controller.

Make sure the exposed section of the T/C lead wires are not contacting each other.



NOTE

Make sure the black insulation sleeving covers the exposed portion of the element lead wires.



NOTE

Make sure the exposed section of the T/C lead wires are not contacting each other.

Muffle (Heating Element) Replacement

- a. Disconnect from power supply.
- b. Set furnace on its door.
- c. Remove (one piece) top, back and bottom cover.
- d. Disconnect element lead wires from relays. (Note placement and connection of.)
- e. Remove clip from thermocouple and pull thermocouple out of muffle.
- f. Remove metal retaining band from defective muffle.
- g. Loosen top adjustment bracket and remove defective muffle.
- h. Insert new muffle with vent hole facing the top of unit.
- i. Readjust top bracket to fit snugly up against muffle. Make sure muffle is laying flush against front case section.
- j. Reinstall metal retaining band and tighten until muffle seats firmly into case section.
- k. Reconnect element lead wires.

On the 120V or 100V muffle there are three element lead wires. Connect the front and the back element lead wires to the mechanical relay. Connect the middle element lead wire to the solid state relay.

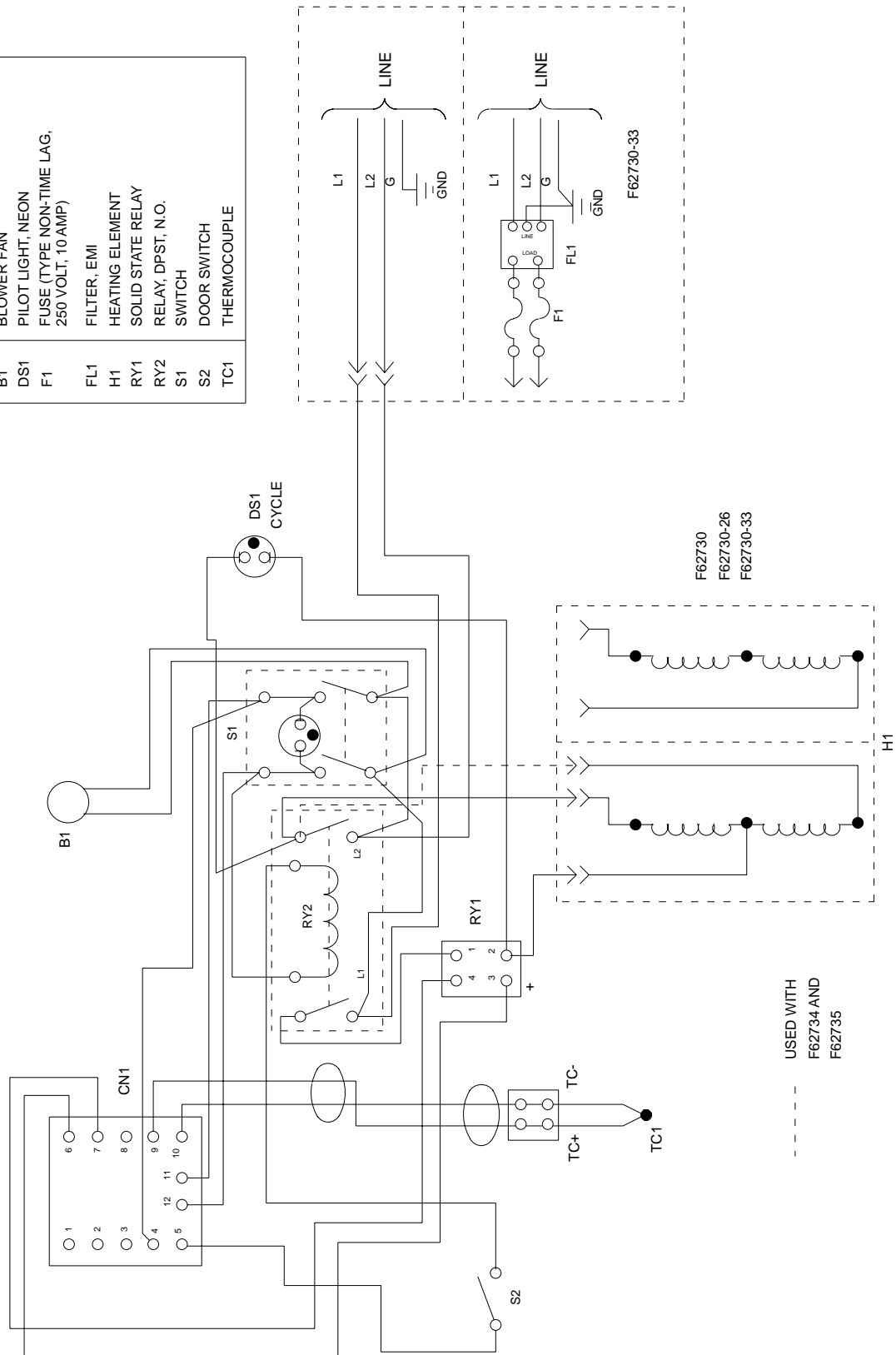
On the 230V and 240V muffles there are two element lead wires. Connect the front element lead wire to mechanical relay. Connect the back element lead wire to the solid state relay.

- l. Reinstall the thermocouple and the retaining clip.
- m. Reinstall the cover section.
- n. Set the furnace upright and test the operation of the furnace.

Wiring Diagrams

DIAGRAM COMPONENT LIST

REF. NO.	DESCRIPTION
CN1	CONTROL
B1	BLOWER FAN
DS1	PILOT LIGHT, NEON
F1	FUSE (TYPE NON-TIME LAG, 250 VOLT, 10 AMP)
FL1	FILTER, EMI
H1	HEATING ELEMENT
RY1	SOLID STATE RELAY
RY2	RELAY, DPST, N.O.
S1	SWITCH
S2	DOOR SWITCH
TC1	THERMOCOUPLE

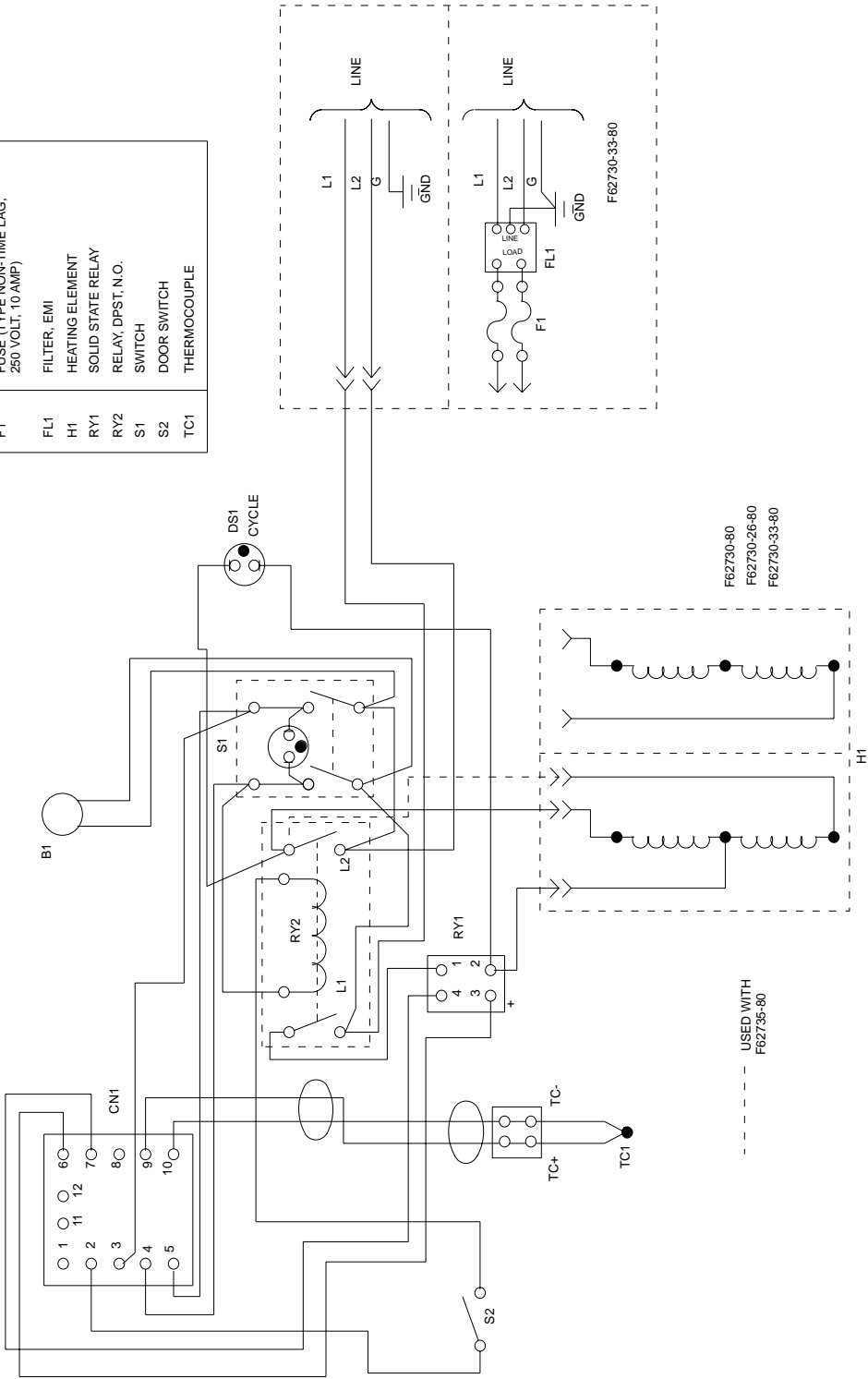


Wiring Diagram
Single Set Point Temperature Control Models

WIRING DIAGRAMS

DIAGRAM COMPONENT LIST

REF. NO.	DESCRIPTION
CN1	CONTROL
B1	BLOWER FAN
DS1	PILOT LIGHT, NEON
F1	FUSE (TYPE NON-TIME LAG, 250 VOLT, 10 AMP)
FL1	FILTER, EMI
H1	HEATING ELEMENT
RY1	SOLID STATE RELAY
RY2	RELAY, DPST, N.O.
S1	SWITCH
S2	DOOR SWITCH
TC1	THERMOCOUPLE



Wiring Diagram
4 Ramp & 4 Dwell Programmable Models

Replacement Parts List

Replacement Parts List

Listed below are the common replacement parts for all models of the F62700 furnace.

PART	PART NO.
Temperature Control (Single Set Point Models)	CN71X45
Temperature Control (4 Ramp & 4 Dwell Programmable Models)	CN71X62
Muffle Heating Element 100V	EL1075X3A
Muffle Heating Element 120V	EL1075X1A
Muffle Heating Element 220-240V	EL1075X2A
Solid State Relay	RYX34
Mechanical Relay 120V, 100V	RYX56
Mechanical Relay 220-240V	RYX57
On/Off Switch 120V	SWX143
On/Off Switch 220-240V	SWX144
Fan 120V, 100V	FAX3
Fan 220-240V	FAX4
Door Switch	SWX163
Thermocouple	TC517X1A
Door Insulation	JC517X1
Hearth Plate (2 required)	PH421X1
Pilot light, 100V & 120V	PLX103
Pilot light, 220-240V	PLX104
Door Assembly, with insulation	DR1075X1A
10 Amp	FZX30
	Fuses, Type Non-Time Lag, 250 Volt,

▪

WARNING

Replace fuses with the same type and rating.

Ordering Procedures

Ordering Procedures

Please refer to the Specification Plate for the complete model number, serial number, and series number when requesting service, replacement parts or in any correspondence concerning this unit.

All parts listed herein may be ordered from the **Barnstead|Thermolyne** dealer from whom you purchased this unit or can be obtained promptly from the factory. When service or replacement parts are needed we ask that you check first with your dealer. If the dealer cannot handle your request, then contact our Customer Service Department at 319-556-2241 or 800-553-0039.

Prior to returning any materials to **Barnstead|Thermolyne Corp.**, please contact our Customer Service Department for a "Return Goods Authorization" number (RGA). Material returned without a RGA number will be refused. Minimum invoice: \$25.

Material Safety Data Sheet

Thermal Ceramics Material Safety Data Sheet

Date Revised: 7/2/91

PRODUCT IDENTIFICATION

Trade Name(s):	CERAFIBER	CAS #:	65997-17-3
Generic Name:	REFRACTORY CERAMIC FIBER INSULATION	Formula:	MIXTURE
Chemical Name:	ALUMINA SILICA	Telephone:	(404) 796-4200
Manufacturer:	Thermal Ceramics		
Address:	P.O. BOX 923, 2102 Old Savannah Road		
City:	Augusta	State:	Georgia
		Zip:	30903

PRODUCT INGREDIENTS

INGREDIENT NAME	CAS NUMBER	%	PEL and TLV (except as noted)
REFRACTORY CERAMIC FIBER		65997-17-3	100 1 FIBER/CC
		EXPOSURE GUIDELINE	
		5mg/M- NUISANCE RESPIRABLE - OSHA	
10mg/M- NUISANCE TOTAL - ACGIH			
CRYSTALLINE SILICA (CRISTOBALITE) WILL FORM "AFTER SERVICE" AT TEMPERATURES >1000°C.			
14464-46-1	>20		0.05 mg/M- OSHA Respirable Dust

PHYSICAL DATA

Appearance and Odor:	WHITE FIBER-NO ODOR.		
Boiling Point:	NA	Evaporation Rate (NA = 1):	NA
Vapor Pressure:	NA	Specific Gravity (water = 1):	2.6
Water Solubility (%):	NIL	Melting Point:	>3000°F
Vapor Density (Air= 1):	NA	% Volatile by Volume:	0

FIRE AND EXPLOSION DATA

Flash Point (Method): NONFLAMMABLE
NFPA Flammable/Combustible Liquid Classification:
NA Flammable Limits: LEL: NA % UEL: NA %

Auto-Ignition Temperature:

NA

HEALTH HAZARDS

Summary/Risks

Summary: EXPOSURE TO DUST FROM THIS PRODUCT SHOULD BE MINIMIZED. ANIMAL INHALATION AND ARTIFICIAL IMPLANTATION STUDIES HAVE REPORTED THE DEVELOPMENT OF TUMORS. BASED ON PRELIMINARY RESULTS, A NOTICE OF SUBSTANTIAL RISK HAS BEEN FILED WITH THE EPA ACCORDING TO SECTION 8(e) OF THE TOXIC SUBSTANCES CONTROL ACT. BASED ON ANIMAL STUDIES, IARC HAS CLASSIFIED RCF AS POSSIBLY CARCINOGENIC FOR HUMANS (2B). DATA FROM HUMAN EPIDEMIOLOGICAL STUDIES IS INSUFFICIENT. THIS SUBSTANCE OR MIXTURE HAS NOT BEEN CLASSIFIED A CARCINOGEN BY NTP OR OSHA.

Medical conditions which may be aggravated: AS WITH ANY DUST, PRE-EXISTING UPPER RESPIRATORY AND LUNG DISEASES

MATERIAL SAFETY DATA SHEET

MAY BE AGGRAVATED.

Target Organ(s): LUNGS, SKIN AND EYES .

Acute Health Effects: PRODUCT IS A MECHANICAL IRRITANT TO SKIN, EYES AND UPPER RESPIRATORY SYSTEM.

Chronic Health Effects: EXCESSIVE EXPOSURE TO RCF DUSTS AND AFTER SERVICE FIBERS MAY CAUSE LUNG DAMAGE (FIBROSIS). IARC STATES THERE IS SUFFICIENT EVIDENCE IN ANIMALS AND LIMITED EVIDENCE IN HUMANS TO CLASSIFY CRYSTALLINE SILICA AS A PROBABLE CARCINOGEN (2A) AND RCF AS A POSSIBLE CARCINOGEN (2B).

Primary Entry Route(s): INHALATION, SKIN AND EYE CONTACT.

Signs/Symptoms of Overexposure

Inhalation: IRRITATION OR SORENESS IN THROAT & NOSE. IN EXTREME EXPOSURES SOME CONGESTION MAY OCCUR.

Skin Contact: TEMPORARY IRRITATION OR RASH.

Skin Absorption: NA

Ingestion: NOT HAZARDOUS WHEN INGESTED. MAY CAUSE TEMPORARY IRRITATION TO GI TRACT.

Eyes: TEMPORARY IRRITATION OR INFLAMMATION

First Aid/Emergency Procedures

Inhalation: REMOVE TO FRESH AIR. DRINK WATER TO CLEAR THROAT AND BLOW NOSE TO EVACUATE FIBERS.

Skin Contact: WASH AFFECTED AREAS GENTLY WITH SOAP AND WARM WATER.

Skin Absorption: NA

Ingestion: NA

Eyes: FLUSH EYES WITH COPIOUS QUANTITIES OF WATER. IF IRRITATION PERSISTS CONSULT A PHYSICIAN.

REACTIVITY DATA

MATERIAL IS STABLE.

HAZARDOUS POLYMERIZATION CANNOT OCCUR.

Chemical Incompatibilities: HYDROFLUORIC ACID

Conditions to Avoid: NONE IN DESIGNED USE.

Hazardous Decomposition Products: NONE

SPILL OR LEAK PROCEDURES

Procedures for Spill/Leak: VACUUM CLEAN DUST WITH EQUIPMENT FITTED WITH HEPA FILTER. IF SWEEPING IS NECESSARY USE A DUST SUPPRESSANT.

Waste Management: WASTES ARE NOT HAZARDOUS AS DEFINED BY RCRA (40 CFR PART 261) . COMPLY WITH FEDERAL, STATE & LOCAL REGULATIONS. METHOD OF DISPOSAL - LANDFILL. RQ - N/A.

SPECIAL PROTECTION INFORMATION

Goggles: GOGGLES OR SAFETY GLASSES WITH SIDE SHIELDS ARE RECOMMENDED.

Gloves: GLOVES ARE RECOMMENDED.

Respirator: <1 F/CC, USE 3M 9900; <10 F/CC, USE MSA COMFO II WITH H FILTER; <50 F/CC, USE MSA ULTRA-TWIN H FILTER; OR EQUIVALENTS. SEE SECTION IX-OTHER.

Ventilation: USE SUFFICIENT NATURAL OR MECHANICAL VENTILATION TO KEEP DUST LEVEL TO BELOW PEL/TLV/WEG (WORK-PLACE EXPOSURE GUIDELINE) USE DUST COLLECTION WHEN TEARING OUT.

Other: WEAR LOOSE FITTING, LONG SLEEVED CLOTHING. WASH EXPOSED AREAS WITH SOAP & WARM WATER AFTER HANDLING. WASH WORK CLOTHES SEPARATELY FROM OTHER CLOTHING; RINSE WASHER THOROUGHLY.

Special Considerations for repair/maintenance of contaminated equipment: CRISTOBALITE RESPIRATOR: <10X PEL, USE 3M 9900; <100X PEL, USE MSA ULTRA-TWIN H FILTER; OR EQUIV. SEE SEC IX-OTHER.

SPECIAL PRECAUTIONS

***** ALWAYS SEGREGATE MATERIALS BY MAJOR HAZARD CLASS *****

THIS PRODUCT CONTAINS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Storage Segregation Hazard Classes: IRRITANT

Special Handling/Storage: KEEP MATERIAL DRY.

Special Workplace Engineering Controls: ADEQUATE VENTILATION TO KEEP DUST LEVEL TO BELOW PEL/TLV/WEG (WORKPLACE EXPOSURE GUIDELINE).

Other: ADDITIONAL INFORMATION ON THE HEALTH AND SAFETY ASPECTS OF REFRACTORY CERAMIC FIBERS IS AVAILABLE.

† Copyright© 1980, National Fire Protection Assoc., Quincy, MA 02269. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety. MSSM/226-21:26/00030

As of the date of preparation of this document, the foregoing information is believed to be accurate and is provided in good faith to comply with applicable federal and state law(s). However, no warranty or representation with respect to such information is intended or given.

MSDS/MSD3 FORM REV. 7/2/91

Barnstead|Thermolyne One Year Limited Warranty

Barnstead|Thermolyne Corporation warrants that if a product manufactured by **Barnstead|Thermolyne** and sold by it within the continental United States or Canada proves to be defective in material or workmanship, it will provide you, without charge, for a period of ninety (90) days, the labor, and a period of one (1) year, the parts, necessary to remedy any such defect. Outside the continental United States and Canada, the warranty provides, for one (1) year, the parts necessary to remedy any such defect. The warranty period shall commence either six (6) months following the date the product is sold by **Barnstead|Thermolyne** or on the date it is purchased by the original retail consumer, whichever date occurs first.

All warranty inspections and repairs must be performed by and parts obtained from an authorized **Barnstead|Thermolyne** dealer or **Barnstead|Thermolyne**. Heating elements, however, because of their susceptibility to overheating and contamination, must be returned to our factory, and if, upon inspection, it is concluded that failure is not due to excessive high temperature or contamination, warranty replacement will be provided by **Barnstead|Thermolyne**. The name of the authorized **Barnstead|Thermolyne** dealer nearest you may be obtained by calling 1-800-446-6060 or writing to:

Barnstead|Thermolyne
P.O. Box 797
2555 Kerper Boulevard
Dubuque, IA 52004-0797
FAX: (319) 556-0695

Barnstead|Thermolyne's sole obligation with respect to its product shall be to repair or replace the product. Under no circumstances shall it be liable for incidental or consequential damage.

THE WARRANTY STATED HEREIN IS THE SOLE WARRANTY APPLICABLE TO **BARNSTEAD|THERMOLYNE** PRODUCTS. **BARNSTEAD|THERMOLYNE** EXPRESSLY DISCLAIMS ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR USE.

Barnstead|Thermolyne

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